SPECIFICATION

TITLE OF THE INVENTION

IMAGE SENSING SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to an image sensing system, a digital still camera and an image data receiving apparatus that construct the image sensing system, an image data communication system, an image data transmitting apparatus and an image data receiving apparatus that construct the image data communication system, a method of controlling the operation of a digital still camera, a method of controlling the operation of an image data receiving apparatus and a method of controlling the operation of an image data transmitting apparatus.

Description of the Related Art

Consideration has been given to a system in which image data obtained by image sensing using a digital still camera is transmitted to an image data receiving apparatus by utilizing a short-distance communication technique such as Bluetooth. When the image of a subject is sensed using the digital still camera in this system, image data representing the image of the subject is stored on a memory card loaded in the digital still camera and is transmitted to the image data receiving apparatus.

When the image data transmitted from the digital

still camera is received by the image data receiving apparatus, the image of the subject represented by the received image data is displayed on the display screen of a display device connected to the image data receiving apparatus. The user can observe the image of the subject displayed on the large display screen of the display device rather than on the small display screen provided on the back of the digital still camera.

As the number of pixels used in the CCD of a digital still camera increases, so does the amount of image data obtained by the sensing of an image. When the amount of data increases, the time needed to transmit image data from the digital still camera to the image data receiving apparatus becomes longer. This lengthens also the time from sensing of the image of the subject to display of the image on the display device connected to the image data receiving apparatus.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to shorten the time it takes for the image of a subject to be displayed on the display screen of a display device connected to an image data receiving apparatus.

Another object of the present invention is to so arrange it that desired main-image data can be acquired in an image data receiving apparatus.

According to a first aspect of the present invention, there is provided an image sensing system comprising a digital still camera (inclusive of a

personal digital assistant having a camera function) and an image data receiving apparatus.

The digital still camera includes an image sensing device for sensing the image of a subject and outputting main-image data representing the image of the subject; a recording controller for recording the main-image data output from the image sensing device on a recording medium in association with an identification code that identifies the image of the subject; a thumbnail-image data generating device for generating thumbnail-image data that represents a thumbnail image the amount of data whereof is less than that of the image of the subject represented by the main-image data output from the image sensing device; and a thumbnail-image data transmitting device for transmitting the thumbnail-image data generated by the thumbnail-image data generating device to the image data receiving apparatus in association with the identification code that corresponds to the corresponding image of the subject.

The image data receiving apparatus includes an image data receiving device for receiving thumbnail-image data transmitted from the thumbnail-image data generating device of the digital still camera and with which the identification code has been associated; and a display controller for controlling a display device in such a manner that the thumbnail image represented by the thumbnail-image data received by the image data receiving device will be displayed in association with

the corresponding identification code.

The digital still camera and image data receiving apparatus may be constructed as stand-alone devices that are independent of each other.

The first aspect of the present invention provides also a method of controlling operation of the above-described digital still camera. Specifically, the invention provides a method of controlling operation of a digital camera comprising the steps of sensing the image of a subject and outputting main-image data representing the image of the subject; recording the main-image data obtained by image sensing on a recording medium in association with an identification code that identifies the obtained image of the subject; generating thumbnail-image data that represents a thumbnail image the amount of data whereof is less than that of the image of the subject represented by the main-image data obtained by image sensing; and transmitting the thumbnail-image data generated to an image data receiving apparatus in association with the identification code that corresponds to the corresponding image of the subject.

The first aspect of the present invention further provides a method of controlling operation of the above-described image data receiving apparatus. Specifically, the invention provides a method of controlling operation of an image data receiving apparatus comprising the steps of receiving thumbnail-image data transmitted from

a digital still camera and with which has been associated an identification code of a corresponding image of a subject; and controlling a display device in such a manner that the thumbnail image represented by the thumbnail-image data received will be displayed in association with the corresponding identification code.

In accordance with the first aspect of the present invention, main-image data representing the image of a subject is obtained when the image of the subject is sensed by a digital still camera. The main-image data is recorded on a recording medium (which may or may not be removable from the digital still camera) in association with an identification code that identifies the image of the subject. A thumbnail image corresponding to the image of the subject represented by the main-image data is generated. The data representing the generated thumbnail image is transmitted from the digital still camera to an image data receiving apparatus in association with an identification code of the corresponding image of the subject.

When the thumbnail-image data transmitted from the digital still camera is received by the image data receiving apparatus, the thumbnail image represented by the received thumbnail-image data is displayed on the display screen of the display device.

The image data transmitted from the digital still camera to the image data receiving apparatus is thumbnail-image data that contains less data than the

main-image data. This makes transmission time shorter than when the main-image data is transmitted. The image (thumbnail image) corresponding to the image of the subject obtained by image sensing can be displayed comparatively promptly.

The image data receiving apparatus preferably is further provided with an identification code input device and an output device for reading main-image data, which corresponds to the identification code entered from the identification code input device, from the recording medium and outputting the main-image data.

The user enters an identification code regarding the displayed thumbnail image. When this done, the main-image data corresponding to the entered identification code is read from the recording medium loaded in the digital still camera. The read main-image data is output from the image data receiving apparatus.

The user observes a thumbnail image and can obtain the main-image data that corresponds to this thumbnail image. Since the main-image data is greater in quantity that the thumbnail-image data, the main image can withstand close scrutiny when it is printed. Thus it is possible to obtain high-resolution image data while maintaining the speedy display of the image (the thumbnail image) that corresponds to the image of the subject.

The image data receiving apparatus may further comprise a user code input device for entering a code

that specifies a user; a user code discriminating device for determining whether the user code entered from the user code input device is legitimate; and a printer controller for controlling a printer in such a manner that the image of a subject represented by main-image data output from the output device will be printed in response to a determination by the user code discriminating device that the entered user code is legitimate.

Thus, an authorized user is capable of printing an image.

The digital still camera may further comprise an image-sensing controller for allowing succeeding sensing of the image of a subject by the image sensing device in response to completion of recording of the main-image data on the recording medium by the first recording controller and of transmission of the thumbnail-image data by the thumbnail-image data transmitting device.

The next image sensing operation is allowed in response to completion of recording of the main-image data on the recording medium and of transmission of the thumbnail-image data to the image data receiving apparatus. As a result, processing for sensing the image of a subject will not be executed during the course of recording processing and transmission processing. This makes it possible to prevent destruction of the main-image data and thumbnail-image data.

A data line that applies main-image data from the image sensing device to the first recording controller and a data line that applies thumbnail-image data from the thumbnail-image data generating device to the thumbnail-image data transmitting device may have portions in common. If such is the case, the first recording controller may record the main-image data on the recording medium in response to pressing of a shutter-release button. The digital still camera further comprises a buffer memory for temporarily storing main-image data that is output from the image sensing device; a first discriminating device for determining whether the shutter-release button has been pressed during transmission of thumbnail-image data by the thumbnail-image data transmitting device; a memory controller for controlling the buffer memory in such a manner that main-image data that is output from the image sensing device is stored in the buffer memory temporarily in response to a determination by the first discriminating device that the shutter-release button has been pressed; and a second recording controller for recording the main-image data, which has been stored temporarily in the buffer memory, on the recording medium in response to a determination that transmission of thumbnail-image data by the thumbnail-image data transmitting device has been completed.

Main-image data that has been obtained by pressing the shutter-release button is stored in the buffer

memory temporarily until transmission of the thumbnail-image data to the image-data receiving apparatus is completed. When the transmission of the thumbnail-image data to the image data receiving apparatus ends, the main-image data is read out of the buffer memory and recorded on the recording medium. Since recording of the main-image data on the recording medium will not be carried out during transmission of the thumbnail-image data, conflict between these two types of image data can be prevented even if a data line that applies the main-image data from the image sensing device to the first recording controller and a data line that applies thumbnail-image data from the thumbnail-image data generating device to the thumbnail-image data transmitting device have portions in common.

A second aspect of the present invention relates to an image data communication system comprising an image data transmitting apparatus and an image data receiving apparatus that are capable of communicating with each other.

The data receiving apparatus comprises an image data receiving device for receiving thumbnail-image data transmitted from a digital still camera and with which has been associated an identification code that identifies the image of a subject; a display controller for controlling a display device in such a manner that the thumbnail image represented by the thumbnail-image data received by the image data receiving device will be

displayed in association with the corresponding identification code; an identification code input device for entering the identification code; and an identification-code data transmitting device for transmitting data, which represents the identification code entered by the identification code input device, to the image data transmitting apparatus.

The image data transmitting apparatus comprises an identification-code data receiving device for receiving data representing an identification code transmitted from the identification-code data transmitting device of the image data receiving apparatus; a reading device for reading main-image data, which corresponds to an identification code represented by identification-code data received by the identification-code data receiving device, from a recording medium on which has been recorded the main-image data with which the identification code is associated; and a main-image data transmitting device for transmitting the main-image data read by the reading device to the image data receiving apparatus.

The second aspect of the present invention provides also a method of controlling operation of an image data receiving apparatus. Specifically, the invention provides a method of controlling operation of an image data receiving apparatus comprising the steps of receiving thumbnail-image data transmitted from a digital still camera and with which has been associated

an identification code that identifies the image of a subject; controlling a display device in such a manner that the thumbnail image represented by the received thumbnail-image data will be displayed in association with the corresponding identification code; and transmitting data, which represents the entered identification code, to the image data transmitting apparatus.

The second aspect of the present invention provides also a method of controlling operation of an image data transmitting apparatus. Specifically, the invention provides a method of controlling operation of an image data transmitting apparatus comprising the steps of receiving data representing an identification code transmitted from an image data receiving apparatus; reading main-image data, which corresponds to an identification code represented by received identification-code data, from a recording medium on which has been recorded the main-image data with which the identification code is associated; and transmitting the read main-image data to the image data receiving apparatus.

In accordance with the second aspect of the present invention, thumbnail-image data, which has been transmitted from a digital still camera and with which an identification code has been associated is received by an image data receiving apparatus. The thumbnail image represented by the thumbnail-image data is

displayed in association with the identification code.

When an identification code is entered, data representing the identification code is transmitted from the image data receiving apparatus to an image data transmitting apparatus.

The image data transmitting apparatus receives data representing an identification code transmitted from the image data receiving apparatus. A recording medium on which main-image data associated with an identification code has been recorded is loaded in the image data transmitting apparatus or is connected thereto in readable fashion. Main-image data corresponding to a received identification code is read from the recording medium. The read main-image data is transmitted from the image data transmitting apparatus to the image data receiving apparatus.

The necessary main-image data can be obtained at the image data receiving apparatus. Since the main-image data contains more data than the thumbnail-image data, a high-resolution image can be obtained. This makes it possible to obtain an image that can withstand scrutiny even when printed.

Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the manner in which an image sensing system is used according to a first embodiment of the present invention;

Fig. 2 is a block diagram illustrating the electrical construction of a digital still camera according to this embodiment;

Fig. 3 is a block diagram illustrating the electrical construction of a file apparatus according to this embodiment;

Fig. 4 illustrates examples of thumbnail images displayed on the display device of the file apparatus;

Figs. 5 and 6 are flowcharts showing processing for implementing communication between the digital still camera and the file apparatus according to this embodiment;

Fig. 7 is a flowchart illustrating processing executed by the file apparatus according to this embodiment;

Fig. 8 is a flowchart illustrating a modification of processing executed by the digital still camera;

Fig. 9 is a flowchart illustrating print processing;

Fig. 10, which illustrates a second embodiment of the invention, shows the manner in which an image sensing system is used; and

Fig. 11 is a flowchart illustrating processing for implementing communication between an image data

transmitting apparatus and the file apparatus according to the second embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described in detail with reference to the drawings.

Fig. 1, which illustrates a first embodiment of the invention, shows the manner in which an image sensing system is used.

The image sensing system comprises a digital still camera 1 and a file apparatus 20 capable of communicating with each other over a short distance.

A photographer PH takes the picture (senses the image) of a subject SU by using the digital still camera 1. The sensing of the image is performed in a photo studio, by way of example.

A user (e.g., if the subject is a person, the user might be a member of this person's family) US waits in a room separate from the photo studio. The file apparatus 20 is placed in this room and has a display device connected to it.

When pictures of the subject SU are taken by the photographer PH using the digital still camera 1, the latter generates thumbnail images of the images of the subject. The generated thumbnail-image data is transmitted from the digital still camera 1 to the file apparatus 20.

The thumbnail images of the subject whose image has

been sensed are displayed on the display screen of the display device connected to the file apparatus 20 placed in the room separate from the studio. While viewing the thumbnail images displayed, the user selects the image to be printed.

Thus, the image to be printed can be selected while images of the subject SU are being sensed. Image data transmitted from the digital still camera 1 to the file apparatus 20 is thumbnail-image data and not the image data obtained by sensing the image of the subject. The thumbnail-image data is small in quantity and therefore can be transmitted in a short period of time. This means that the thumbnail images can be displayed quickly. Further details will become apparent from the description that follows.

Fig. 2 is a block diagram showing the electrical construction of the digital still camera 1.

The overall operation of the digital still camera 1 is controlled by a CPU 11.

The digital still camera 1 is provided with a mode switch 17 by which it is possible to set an ordinary imaging mode (in which the camera does not communicate with the file apparatus 20), a wireless communication imaging mode (in which the camera communicates with the file apparatus 20) and a playback mode. A signal representing the mode set by the mode switch 17 is input to the CPU 11.

The digital still camera 1 is further provided with

a shutter button 13. A signal indicating that the shutter button 13 has been pressed also is input to the CPU 11.

If the wireless communication imaging mode is selected by the mode switch 17 (the ordinary imaging mode and playback mode have no direct bearing upon this invention and need not be described), the image of the subject is formed on the photoreceptor surface of a solid-state image sensing device (CCD, etc.) by an imaging lens 2. A video signal representing the image of the subject is output from the solid-state image sensing device 3.

The video signal is converted to digital image data by an analog/digital converter circuit 4. The digital image data is applied to a display device 12 by a controller 6 via the CPU 11 so that the image of the subject is displayed on the display screen of the display device 12.

If the shutter button 13 is pressed, image data (main-image data) output from the analog/digital converter circuit 4 is applied to a main-image memory 8, where the image data is stored. The main-image data is read out of the main-image memory 8 and input to an image processing/compressing circuit 7. The latter executes compression processing and other image processing.

An ID generating circuit 9 generates an image ID for identifying an image.

An image file is generated in such a manner that the generated image ID is recorded in the header of the image file and the compressed main-image data is recorded in an image data recording area of the image file. The generated image file is applied to and recorded on a memory card 19 by the controller 6 via a card interface 16.

The main-image data that has been stored in the main-image memory 8 is subjected to compression processing and the like by the image processing/compressing circuit 7 and thumbnail-image data is generated by the CPU 11, as mentioned above. The generated thumbnail-image data is applied to and stored in a thumbnail memory 10. The thumbnail-image data is applied to an antenna 15 via a wireless interface 14. The thumbnail-image data is transmitted from the antenna 15 to the file apparatus 20.

A data line for applying the compressed image data to the card interface 16 and a data line 18 for applying the thumbnail-image data, which has been stored in the thumbnail memory 10, to the wireless interface 14 have portions in common. However, it goes without saying that mutually independent data lines may be used.

Fig. 3 is a block diagram illustrating the electrical construction of the file apparatus 20.

The overall operation of the file apparatus 20 is controlled by a CPU 25.

Thumbnail-image data transmitted from the digital

still camera 1 as described above is received by an antenna 21. The thumbnail-image data received by the antenna 21 is applied to a controller 26 via a wireless interface 22. The thumbnail-image data is input to an analog/digital converter circuit 29 by the controller 26, whereby the data is converted to an analog video signal. The analog video signal is applied to a display device 30 so that the thumbnail image is displayed on the display screen of the display device 30.

Fig. 4 shows an example of a display screen 33 of the display device 30.

The display screen 33 is formed to have a number of display areas 34 for displaying thumbnail images. A thumbnail image represented by thumbnail-image data transmitted from the digital still camera 1 is displayed in each thumbnail-image display area 34.

Displayed below each thumbnail image is the image ID (Image 001, etc.) of the thumbnail image. [This is the ID of the main image (the image represented by main-image data) that corresponds to the thumbnail image. Though the image ID of the thumbnail image and the ID of the main image that corresponds to this thumbnail image are the same, the image IDs need not necessarily be the same as long as the corresponding relationship between the thumbnail image and the main image is known.] The thumbnail image and the main image can be specified by the image ID.

With reference again to Fig. 3, the file apparatus

20 is capable of being remote-controlled by a remote controller (not shown). A control signal transmitted from the remote controller is received by a remote-control interface 24. The remote-control signal also includes data that indicates an image ID specified by the user.

The received remote-control signal is input to the CPU 25. If the remote-control signal includes data indicative of an image ID, the data representing the image ID is extracted from the signal by the CPU 25. The data representing the image ID is applied to and stored in a buffer memory 27 by the controller 26.

The file apparatus 20 is provided with a card interface 23. The memory card 19 on which an image file containing compressed main-image data has been recorded in the manner described above can be loaded in the file apparatus 20. When the memory card 19 is loaded in the file apparatus 20, the header of the image file recorded on the memory card 19 is read. The image ID that has been recorded in the header is input to the CPU 25 via the card interface 23.

The CPU 25 compares the image ID read from the memory card 19 and the image ID that has been stored in the buffer memory 27. If an image ID the same as the image ID read from the memory card 19 has been stored in the buffer memory 27, then it is judged that the main-image data specified by the image ID read from the memory card 19 represents the main image specified by

the user. The main-image data for which the same image ID has been stored in the buffer memory 27 is read from the memory card 19.

Since the main-image data that has been read from the memory card 19 is compressed data, this data is applied to an expansion/image processing circuit 28 by the controller 26, whereby the compressed main-image data is subjected to predetermined playback processing such as expansion.

The expanded main-image data is applied to a printer interface 31 by the controller 26. The main image corresponding to the thumbnail image selected by the user is printed by a printer 41 connected to the printer interface 31.

Figs. 5 and 6 are flowcharts illustrating processing executed by the digital still camera 1 and file apparatus 20.

The power supply of the digital still camera 1 is turned on and the wireless communication imaging mode is selected by the photographer PH (step 51). As a result, data indicative of a connect command is transmitted from the digital still camera 1 to the file apparatus 20 (step 52).

When the connect command transmitted from the digital still camera 1 is received by the file apparatus 20, the latter sends data indicating that a wireless connection has been made back to the digital still camera 1 (step 71). In addition, the file apparatus 20

creates image folders that are associated by the model name of the digital still camera 1, the date, etc. (step 72).

If data sent back from the file apparatus 20 indicating that the wireless connection has been established is received ("YES" at step 53), it is determined whether the shutter button 13 has been pressed (step 54).

If the shutter button 13 has been pressed ("YES" at step 54), the image of the subject SU is sensed (step 55), as described above, and main-image data representing the image of the subject is obtained. The main-image data is stored in the main-image memory 8 temporarily (step 56). The main-image data stored in the main-image memory 8 may or may not be compressed by the image processing/compressing circuit 7, as mentioned earlier.

The CPU 11 generates thumbnail-image data from the main-image data (step 57). The generated thumbnail-image data is stored in the thumbnail memory 10 (step 58).

The ID generating circuit 9 generates an image ID with respect to the sensed image of the subject (step 59). When the image ID is generated, it is recorded in the header of the image file in which the corresponding main-image data is stored. The main-image file having the image ID recorded in its header and the main-image data recorded in its image data recording area is

recorded on the memory card 19 that has been inserted into the digital still camera 1 (step 60). Recording processing continues until the recording of the main-image file ends (step 61).

When recording of main-image data on the memory card 19 ends, the thumbnail-image data representing the thumbnail image that corresponds to the main image is recorded in the thumbnail-image data recording area of the thumbnail-image file and an image ID identical with the image ID of the corresponding main image is stored in the header. The thumbnail-image file is transmitted from the digital still camera 1 to the file apparatus 20 (step 62). Processing for transmitting the thumbnail-image file continues until transmission of the thumbnail-image file ends (step 63).

If the memory card 19 that has been loaded in the digital still camera 1 runs out of vacant space ("YES" at step 64) or when photography ends, the photographer PH removes the memory card 19 from the digital still camera 1 (step 65).

When a thumbnail-image file transmitted from the digital still camera 1 is received by the file apparatus 20, the received thumbnail-image file is stored in the buffer memory 27 (step 73). The thumbnail-image file is read out of the buffer memory 27 and applied to the display device 30. The thumbnail image and the image ID are displayed on the display screen 33 of the display device 30 (step 74), as shown in Fig. 4.

If an image ID is designated by the user ("YES" at step 75), then data representing the designated image ID is stored in the buffer memory 27 (step 76).

Fig. 7 is a flowchart illustrating print processing executed by the file apparatus 20.

When sensing of the image of the subject SU ends, the memory card 19 that has been extracted from the digital still camera 1 is loaded in the file apparatus 20 (step 81). The headers of main-image files that have been recorded on the memory card 19 are read and the image IDs that have been recorded in the headers are read. From among the image IDs that have been read from the memory card 19, the main-image data corresponding to an image ID identical with the image ID that has been stored in the buffer memory 27 is read from the memory card 19 (step 82).

The main-image data read from the memory card 19 represents the main image that corresponds to the thumbnail image designated by the user. The data representing this main image is stored in an image folder already generated (step 83).

The main-image data that has been stored in the image folder is applied to the printer 40 via the printer interface 31. The main image corresponding to the thumbnail image designated by the user is printed by the printer 40 (step 84). Since the main image has a high resolution, a high-resolution main image is printed.

Fig. 8 is a flowchart illustrating a modification of the processing executed by the digital still camera 1.

Processing steps in Fig. 8 that are identical with those shown in Fig. 6 are designated by like step numbers and need not be described again.

When an image ID is generated in the processing of Fig. 6, the generated image ID is stored in the header and the main-image file is recorded on the memory card 19 without confirming that the thumbnail-image file is being transmitted to the file apparatus 20.

By contrast, in the processing shown in Fig. 8, whether the thumbnail-image file is being transmitted to the file apparatus 20 is checked (step 66).

If transmission of thumbnail-image file is in progress ("YES" at step 66), then the processing of step 60 is skipped. Since transmission of the thumbnail-image data and recording of the main-image data will not take place simultaneously, a conflict of data can be prevented in the digital still camera 1 even if the data line 18 for applying the thumbnail-image data to the wireless interface 14 and the data line 18 for applying the main-image data to the card interface 16 have portions in common.

When transmission of the thumbnail-image data ends ("YES" at step 63), then main-image data not yet recorded on the memory card 19 is recorded on the memory card 19 (step 67).

Fig. 9 is a flowchart illustrating an example of print processing by the file apparatus.

The header of a main-image file that has been recorded on the memory card 19 loaded in the file apparatus 20 is read (step 91). It is determined whether the image ID contained in the read header is the same as an image ID that has been stored in the buffer memory 27 (namely the image ID designated by the user) (step 92). If the two are not the same, a command for reading out the next image file is applied (step 99). The header of the next image file is read.

If the two image IDs are the same ("YES" at step 92), this means that the main-image file is one in which has been stored main-image data representing the main image that corresponds to the thumbnail image designated by the user. The image data is read from the main-image file (step 93). The read main-image data is applied to the expansion/image processing circuit 28 and is subjected to playback processing such as expansion (step 94).

A user code is entered by the user by employing the remote controller (step 95). It is determined whether the user code is one that authorizes printing. If the entered user code is authentic ("YES" at step 96), then the expanded main-image data is applied to the printer interface 31 (step 97) and the main image is printed by the printer 40.

The processing of steps 91 to 93 is repeated for

all main-image files that have been recorded on the memory card 19 loaded in the file apparatus 20 (step 98). The header information of the next image is read (step 99).

Figs. 10 and 11 illustrate a second embodiment of the present invention.

Fig. 10 shows the manner in which the image sensing system according to this embodiment is used.

The first embodiment is such that when the image of the subject SU is sensed, the memory card 19 on which the main-image data has been recorded is removed from the digital still camera 1 and then loaded in the file apparatus 20. The main-image data that has been recorded on the loaded memory card 19 is read into the file apparatus 20.

By contrast, in the example of use shown in Fig. 10, the memory card 19 that has been loaded in the digital still camera 1 is removed from the digital still camera 1 and is loaded in an image data transmitting apparatus 100. The latter reads the main-image data that has been recorded on the memory card 19 and can transmit the data to a file apparatus 20A. The main-image data that has been transmitted from the image data transmitting apparatus 100 is received by the file apparatus 20A. (The file apparatus 20A has the same structure as that of the file apparatus 20 but differs in that it transmits data indicative of an image ID to the image data transmitting apparatus 100). The labor

involved in bringing the memory card 19 to the other room and loading it in the file apparatus 20 is eliminated.

The image data transmitting apparatus 100 can accept insertion of the memory card 19 and can transmit main-image data to the file apparatus 20A. It therefore has a structure substantially the same as that of the digital still camera 1. An arrangement can be adopted in which the digital still camera 1 is used for the image data transmitting apparatus 100.

Fig. 11 is a flowchart illustrating processing for transmitting main-image data to the file apparatus using the image data transmitting apparatus according to the second embodiment.

The digital still camera 1 is used to sense the image of the subject SU, as described earlier. A main-image file whose image ID has been recorded in the header is recorded on the memory card 19 and a thumbnail-image file whose image ID has been recorded in the header is transmitted from the digital still camera 1 to the file apparatus 20.

The memory card 19 is removed from the digital still camera 1 and is loaded in the image data transmitting apparatus 100 (step 111), whereupon the wireless connect command is transmitted from the image data transmitting apparatus 100 to the file apparatus 20A (step 112).

When the connect command transmitted from the image

data transmitting apparatus 100 is received by the file apparatus 20A, a command to transmit the main-image data having the image ID stored in the buffer memory 27 is transmitted from the file apparatus 20A to the image data transmitting apparatus 100 (step 121).

When the transmit command that has been transmitted from the file apparatus 20A is received by the image data transmitting apparatus 100, the main-image file specified by the image ID for which the transmit command has been received is read out of the memory card 19. The main-image file read out is transmitted from the image data transmitting apparatus 100 to the file apparatus 20A (step 113).

When the main-image file transmitted from the image data transmitting apparatus 100 is received by the file apparatus 20A, the received main-image file is stored in the buffer memory 27 (step 122). The main-image file stored in the buffer memory 27 is read out and applied to the printer 40, whereby the main image corresponding to the thumbnail image selected by the user is printed (step 123).

In the embodiments described above, the digital still camera 1 is used in a photo studio and the file apparatus 20 (20A) is used in another room. However, it goes without saying that separate rooms need not necessarily be used.

Further, it goes without saying that some of the above circuitry may be implemented by software rather

than hardware.

Communication between the digital still camera and file apparatus may be short-distance wireless communication, which uses a 2.4-GHz carrier, or long-distance wireless communication. Further, if thumbnail-image data can be received, what communicates with the digital still camera can be a printing system and not just a file apparatus. Furthermore, it will suffice if the size of a thumbnail image is smaller than that of the main image. Examples of thumbnail-image size are 160 × 120 pixels and 640 × 480 pixels (VGA). In addition, communication is not limited to wireless communication; it is possible to use wired communication that utilizes copper wire or optical cable.

As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.